however, a light beam incident from the transparent resin surface impinges on the gold wires and is reflected therefrom so that the reflected light beam is incident on the image sensing area. As a result, flare or smear may occasionally occur in an image and the problem is encountered that flare and smear cannot be reliably prevented.

[0011] It is therefore an object of the present invention to provide a semiconductor image sensing element which is thin, compact, and easy to fabricate and also allows reliable prevention of optical noise and a fabrication method therefor, and a semiconductor image sensing device and a fabrication method therefor.

[0012] To solve the problem described above, a first semiconductor image sensing element according to the present invention comprises: a semiconductor element having an image sensing area, a peripheral circuit region, a plurality of electrode portions provided in the peripheral circuit region, and a plurality of micro-lenses provided on the image sensing area; and an optical member having a configuration covering at least the image sensing area and bonded over the micro-lenses via a transparent bonding member, wherein at least one of a light shielding film and a light shielding pattern is provided on a side surface region of the optical member to serve as a light shielding portion for preventing the image sensing area from being irradiated with a reflected light beam or a scattered light beam from the side surface region.

[0013] In the arrangement, at least one of the light shielding film and the light shielding pattern is formed on the side surface region of the optical member so that a reflected light beam or a scattered light beam is prevented from being incident on the image sensing area from the side surface region of the optical member. As a result, optical noise such as flare or smear can be reliably prevented. Since the optical member is bonded directly over the micro-lenses on the image sensing area by using the transparent bonding member, a thin and compact semiconductor image sensing element can be implemented. For the transparent bonding member, a material having either or both of a UV setting property and a thermosetting property can be used by way of example. The transparent bonding member can be formed by a drawing method, a printing method, or the like.

[0014] A second semiconductor image sensing element according to the present invention comprises: a semiconductor element having an image sensing area, a plurality of electrode portions, and a plurality of micro-lenses provided on the image sensing area; an optical member having a configuration covering at least the image sensing area and bonded over the micro-lenses via a transparent bonding member; and a light shielding member formed on an exposed region of the transparent bonding member, on a side surface region of the optical member, and on a surface of a peripheral circuit region to have openings for exposing the electrode portions.

[0015] In the arrangement, the light shielding member is formed on the surface of the peripheral circuit region including the exposed region of the transparent bonding member and the side surface region of the optical member, except for the electrode portions. As a result, a reflected light beam or a scattered light beam is prevented from being incident on the image sensing area from the side surface region of the optical member. Therefore, optical noise such as flare or smear can be reliably prevented. Since the optical member is bonded directly over the micro-lenses on the image sensing area by using the transparent bonding member, a thin and compact semiconductor image sensing element can be implemented. For the transparent bonding member, a material having either or both of a UV setting property and a thermosetting property can be used by way of example. The transparent bonding member can be formed by a drawing method, a printing method, or the like.

[0016] In the structure described above, the side surface region of the optical member may be configured to tilt with respect to a light receiving surface. Alternatively, the side surface region of the optical member may be formed into a rough surface. The arrangement can more reliably prevent the incidence of a reflected light beam or a scattered light beam on the image sensing area from the side surface region of the optical member.

[0017] In the structure described above, a material of the optical member may be made of Pyrex (registered trademark) glass, Terex glass, quartz, an acrylic resin, or an epoxy resin. Since the arrangement allows the use of a relatively hard material, bonding can be performed with excellent parallelism to the image sensing area. In addition, an external light beam is allowed to be efficiently incident on the image sensing area due to less absorption of the light beam.

[0018] In the structure described above, bumps may be formed on respective surfaces of the electrode portions of the semiconductor element. The arrangement makes it possible to implement a more compact and thinner semiconductor image sensing device by mounting the semiconductor image sensing element on a mounting substrate by a face-down mounting method.

[0019] A first method for fabricating a semiconductor image sensing element according to the present invention comprises the steps of: preparing a semiconductor wafer on which semiconductor elements each having an image sensing area, a peripheral circuit region, a plurality of electrode portions disposed in the peripheral circuit region, and a plurality of micro-lenses provided on the image sensing area are arranged as an array; forming at least one of a light shielding film and a light shielding pattern on a side surface of each of optical members having a configuration covering at least the image sensing area; forming a transparent bonding member on the image sensing area of each of the individual semiconductor elements on the semiconductor wafer; aligning the optical members with respect to the individual image sensing areas and bonding the optical members to the individual semiconductor elements by using the transparent bonding members; and cutting the semiconductor wafer into the separate individual semiconductor elements.

[0020] The method allows the semiconductor image sensing element having a structure which prevents the incidence of a reflected light beam or a scattered light beam on the image sensing area from the side surface region of the optical member to be fabricated with a high yield and in simple process steps. For the transparent bonding member, a material having either or both of a UV setting property and a thermosetting property can be used by way of example. The transparent bonding member can be formed by a drawing method, a printing method, or the like. The optical member can be bonded by using the transparent bonding